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A NEW SPECIES OF THYROCOCCUM

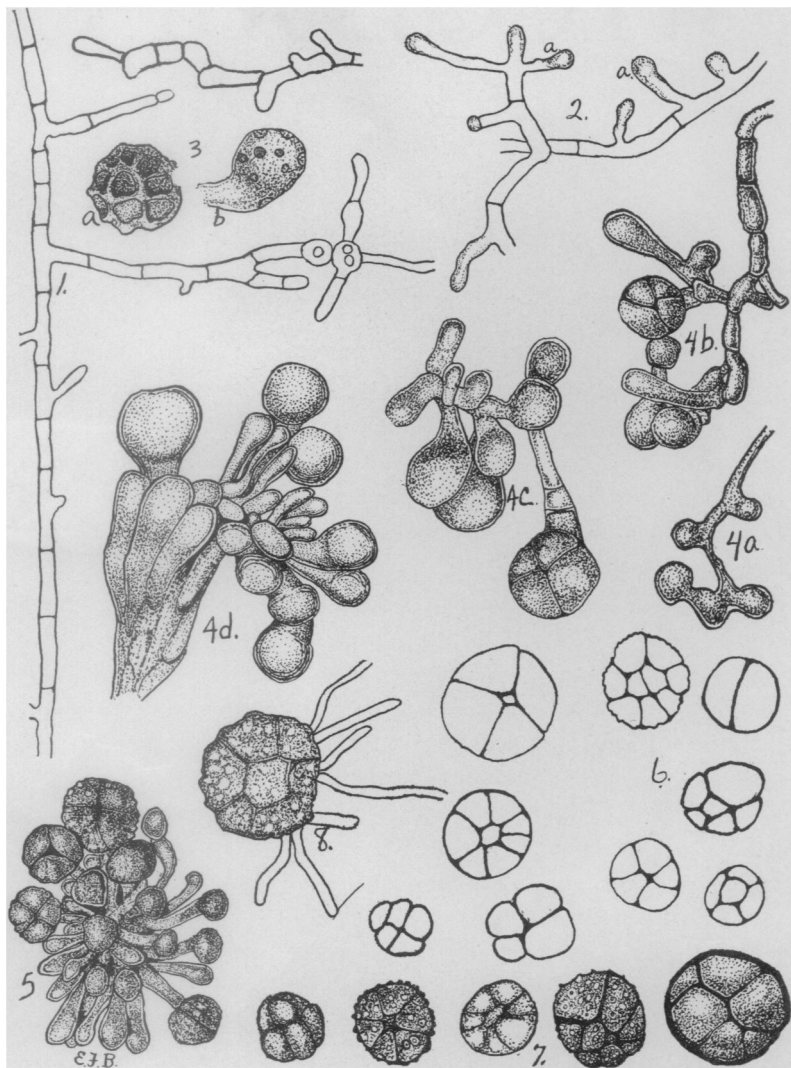
R. E. BUCHANAN

(WITH PLATES 34 AND 35, CONTAINING 10 FIGURES)

The isolation in pure cultures of a hyphomycete at first referred to the genus *Epicoccum* has recently afforded an opportunity for a study of this form. It has been found on several occasions growing on dextrose, nitrogen-free, agar plates prepared from dilutions of a black loam soil rich in humus. The life history of the members of this genus, particularly the development and septation of the spores, seems to be imperfectly understood.

The genus *Epicoccum* Link is characterized by its dark, unicellular (or rarely multicellular) spores, borne singly on conidiophores massed in a dense sporodochium. The septation of the spores is not easily observed, and doubt has been expressed as to whether these so-called septa are not merely superficial markings. Lindau (Rabenhorst's Krypt. Flora 9: 595. 1909) says: "v. Höhnelt hat vorgeschlagen, die Gattung zu Teilen und die Arten mit einzelligen Konidien bei *Epicoccum* zu belassen, und die mit mehrzelligen Konidien zu *Thyroccum* zu stellen. . . . Wir wissen nämlich nicht ob die einzelligen Konidien sich nicht doch später noch teilen. Ferner kennen wir die Art der Teilung der Konidien nur bei wenigen Arten genauer und auch hier bleibt noch eine gewisse Unsicherheit zurück. Sie liess nur damit haben, dass man die Keimung der Konidien beobachtet, um dadurch zu sehen, ob wir es mit einem Konglomerat von Konidien

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THYROCOCCUM HUMICOLA BUCHANAN

oder mit einer einheitlichen Konidie zu tun haben. . . . Diese Schwierigkeiten könnten nur durch eine genaue Untersuchung der Konidienbildung und -teilung behoben werden."

The mycelium of this organism develops readily in a variety of media, most luxuriantly in those containing dextrose. Mannite N free agar, dextrose, starch and mannite N free nutrient solutions, solidified blood serum, dextrose and peptone gelatin, and peptone solutions all support good growths. The hyphae are much branched, and cross and recross in every direction. For the most part, they remain near the surface of the medium, the organism being a strict aërobie. The hyphae vary considerably in diameter, from 3 to 8 μ . They are septate and usually granular. The mycelial threads lying in the medium are hyaline and colorless, at least when young; from them is diffused a pigment, which is brown in dextrose and lemon-yellow and later brown in mannite media. This pigment is soluble in alcohol and in water. Aërial hyphae are developed in considerable numbers. In the absence of an excess of moisture, these produce the sporodochia and the spores; in a saturated atmosphere, they form pink or brown masses of hyphae several millimeters in diameter. The hyphae lying in the medium show marked antibiosis toward the hyphae of certain species of *Penicillium* and some other molds.

The sporodochia arise from the aërial hyphae. Certain threads branch and rebranch to form a dense mass, or sporodochium, from which the conidiophores develop. The tips of the latter become fuscous and swell to form the spores. The conidiophores are from 5 to 25 μ in length, and septate when long. The spore is not readily broken off. These sporodochia are usually spherical or ovoid and vary in diameter when mature from 50 to 500 μ . The young sporodochia may be early recognized by the fuscous tips of the branches of the aërial hyphae.

The sporodochia and spores are not developed readily in a saturated atmosphere. A thick layer of agar, for example, in the bottom of a Petri dish will prevent the formation of spores, although under these conditions there may be an abundant production of aërial hyphae. If the cover of such a plate be removed and the surface of the medium allowed to dry somewhat,

the beginnings of sporodochia may be found in great abundance within twenty-four hours.

The spores are spherical, rarely becoming somewhat irregular by the distension of one or more cells. They are 10–25 μ , usually about 20 μ , in diameter, brown when young, when mature opaque, shining, coal-black, and waxy. The mature spores are multi-septate. The septa begin to appear when the spore is two thirds grown, but the mature spores are too opaque to reveal the internal structure readily, although in a few individuals the septa may be seen. There can be no doubt of their septate character after an examination of Plate 34, figures 4 to 7, and particularly Plate 35, figure 2, which illustrates the many tubes which issue from a germinating spore. As suggested by Lindau in the quotation above, we may refer this species to the genus *Thyroccum* rather than *Epicoccum* on the basis of the septation of its spores. It is possible that several other species with occasionally septate spores that have been described as *Epicoccum* belong to *Thyroccum*. The septa in some cases radiate from the center and give the spore the appearance of a musk-melon with longitudinal grooves. More frequently, however, they are placed irregularly. The surface of the spore is areolate and somewhat tuberculate. A diagnosis of the species follows.

***Thyroccum humicola* sp. nov.**

Hyphis sterilibus, decumbentibus vel assurgentibus, in agar hyalinis, in aere fuscis, roseis vel brunneis, multis ramosis, septatis; sporodochiis orbicularis sparse gregariis vel separatis, raris confluentibus, 50 to 500 μ diam., fuscis; conidiis, sphaericis vel raris irregularis, multo-septatis, dictyosporis, 10–25 μ in diam. non stipitatis, reticulatis, verrucosis, primo atrobrunneis denique nigris.

Hab. in dextrose agar pulvere terrae humosae infecta.

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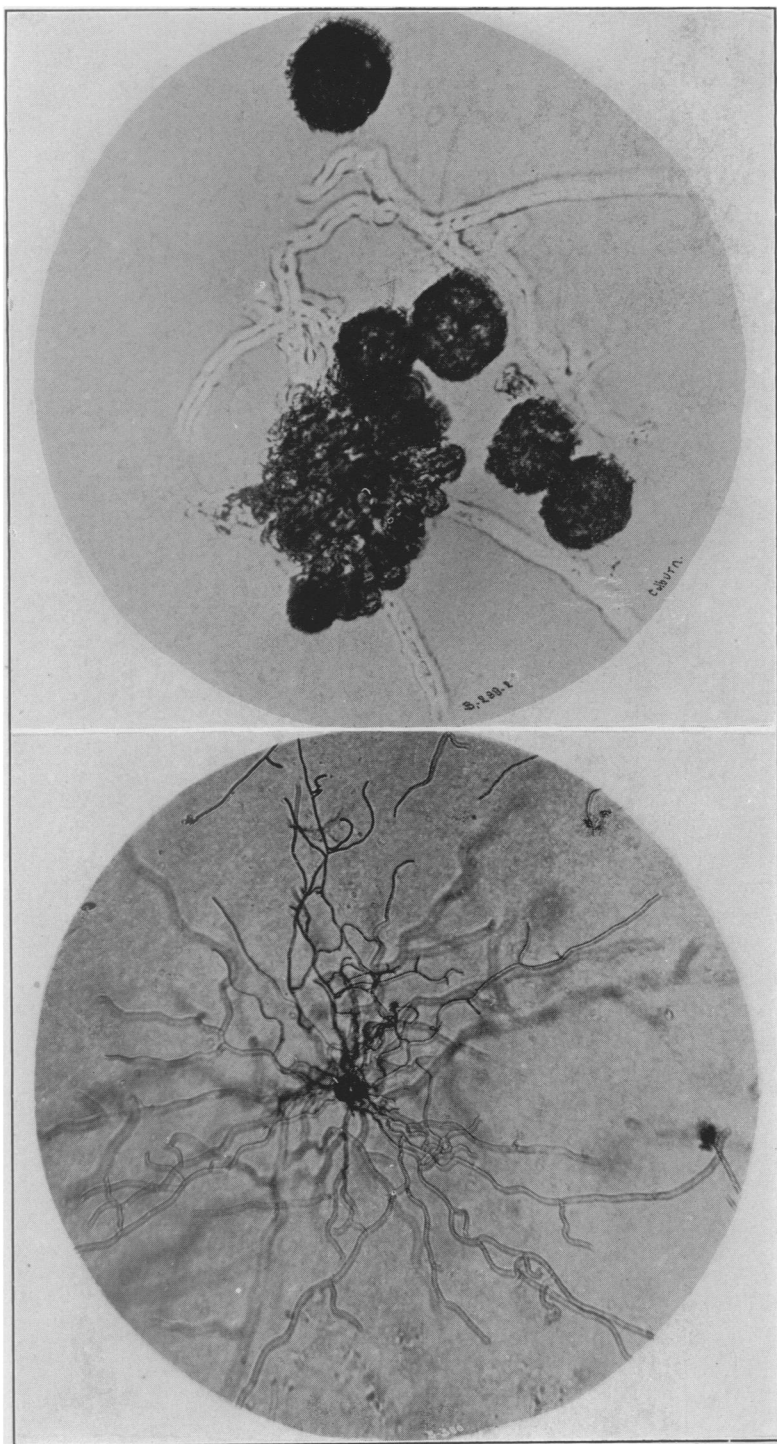
EXPLANATION OF PLATE 34 (frontispiece)

1. Mycelium grown on dextrose agar plate. $\times 1000$.
2. Aerial mycelium showing the fuscous tips of the branches, the beginning of a sporodochium. $\times 1000$.
3. Young spores. $\times 1000$.
4. Young sporodochia in various stages of development. $\times 1000$.
5. Young sporodochium. $\times 1000$.
6. Outlines of spores, showing variety of septation. $\times 800$.
7. Spores, matured, showing septa. The distinctness of the walls is somewhat exaggerated. $\times 800$.
8. Germinating spores, showing the hyphae originating from several cells. $\times 800$.

EXPLANATION OF PLATE 35

1. Microphotograph of young sporodochium on aerial hyphae. Some of the spores may be seen to be septate. On dextrose N-free agar. $\times 1000$.
2. Microphotograph of single germinating spore. Note that the hyphae originate from many points on the surface. Higher magnification shows the spore to be multiseptate and hyphae originate from different cells, frequently several from a single cell. $\times 400$.

This plate is reproduced by courtesy of the Iowa Agricultural Experiment Station.



THYROCOCCUM HUMICOLA BUCHANAN